

ROYAL BOTANIC GARDENS, KEW.

BULLETIN
OF
MISCELLANEOUS INFORMATION.

No. 8]

[1925

XXXVIII.—THE MAURITIUS COLLEGE OF AGRICULTURE.

We learn with interest that the Mauritius College of Agriculture was formally inaugurated by His Excellency Sir Herbert Read, K.C.M.G., C.B., Governor of Mauritius, on March 12th, 1925. The foundation stone of the college was laid in 1923 by Sir Hesketh Bell, then Governor of Mauritius, and the completion of the new building, which is a very fine and well designed edifice, is a matter on which we should like to be allowed to offer our hearty congratulations to the Colony. The new building, which has now been opened, does not really mark the beginning of the activities of the Agricultural College, as work has been going on in temporary buildings for about a year and a half, and work was actually started in the new building in January of this year.

The opening ceremony was performed in the presence of a distinguished company representing all the various activities in Mauritius, and the Director of Agriculture opened the proceedings with an appropriate address from which the following paragraphs are taken:—

“ May I very briefly trace the history of the events which have
“ led to its erection? The movement of which it is the embodi-
“ ment took its rise some five and thirty years ago when the late
“ Mr. Bonâme, then Director of the Station Agronomique, in-
“ augurated the practice of taking one or two pupils into his
“ small laboratory at Réduit for training as Agricultural Chemists.
“ When the Department of Agriculture was created in 1913,
“ my predecessor, Mr. Stockdale, was quick to recognise the value
“ of the work already accomplished and gave to it a certain
“ extension; he standardised the courses of instruction, in-
“ augurated occasional courses of lectures and introduced the
“ general study of Agriculture into the curriculum. Subsequently,
“ lecture courses were strengthened and the teaching further
“ systematised. In 1921, the Chamber of Agriculture and the
“ ‘ Société des Chimistes ’ decided that the time was ripe further
“ to broaden the teaching so as to make, what was then termed
“ the School of Agriculture, into a training ground not only for

" Factory Chemists, but also for Estate employés and future
 " administrators and managers. After prolonged discussion,
 " and with the sympathetic assistance of Government, the matter
 " was finally arranged and the scheme, which to-day is in full
 " working order, evolved. It provided for the erection of this
 " building, the working out of courses of instruction, the engage-
 " ment of additional teaching staff, the provision of laureateships
 " for the study in other countries of matters relating to Agriculture
 " and Sugar Manufacture by selected students of the institution
 " and for the extension of the research facilities of the Department
 " of Agriculture ; the requisite funds for the scheme have been
 " provided by Planters from special taxation, the cost of the
 " building having been voted from the Improvement and Develop-
 " ment Fund, while the working expenses are provided from the
 " proceeds of a special export tax on sugar. The designs of the
 " building were prepared by Mr. H. B. Creswell, Architect of the
 " Crown Agents ; the erection has been carried out by the Public
 " Works Department under the direction of the Honourable
 " Mr. Le Juge de Segrain and his locum tenens, the Honourable
 " Major Régnaud. The laboratory equipment has been ordered
 " and installed under the general direction of the Department
 " of Agriculture. The Clerk in charge of the works throughout
 " has been Mr. D. Gébert. The total cost of the building and of
 " the equipment has been Rs. 200,000 ; of this Rs. 142,000 have
 " been provided from the Development Fund and Rs. 58,000 for
 " the equipment, from the accumulated proceeds of the tax.
 " An inspection of the work done will, I believe, convince you
 " that the building, as a whole, reflects credit both on the architect
 " and on those who were responsible for carrying out his designs,
 " while the cost in the circumstances must, I think, be regarded
 " as distinctly moderate.

" As part of the teaching facilities, we have available the
 " experimental fields, the Stock Farm, the Dairy and other lines
 " of work carried on by the Agricultural Department, while we
 " have succeeded in enlisting the sympathies of estates so that
 " arrangements have been possible for periodical visits to be paid
 " thereto by students under the guidance of Lecturers during
 " term time, while certain estates have agreed to accept students
 " as volunteer workers during vacations.

" The courses of instruction aim at combining a grounding
 " in the sciences which underlie Agriculture with practical training
 " in Agriculture, Horticulture, Surveying, Animal Husbandry,
 " Carpentry, Engineering and the Technology of Sugar Manu-
 " facture. They are based on curricula which have been adopted
 " in similar institutions in Great Britain, the Dominions and the
 " United States of America, with modifications which seemed
 " appropriate to our local conditions. They are fully described
 " in the Prospectus.

" The full course of instruction leading to the Diploma covers
 " three years ; in addition, special courses are provided for persons

“ desiring to qualify as Agricultural Chemists and as Veterinary Surgeons ; facilities are also accorded for holding the examinations in Sugar Technology of the City and Guilds of London Institute while, by an arrangement with that institution, any student who passes this examination and holds a Diploma of the College becomes entitled to the full Technological Certificate of the City and Guilds.

“ The response that has been made so far is decidedly gratifying, and we have at present, working in the College, twenty young men who are taking the full Diploma course in addition to a number of others who are taking special courses.”

Dr. Tempany's address was followed by an interesting speech from the Honourable Sir Henry Leclézio, K.C.M.G., dealing with the history of Sugar Research in Mauritius, and then His Excellency the Governor declared the College open and wished it every success.

After distributing the prizes, medals and certificates won by the Students during the year His Excellency delivered the following address :—

“ I regret that Sir Hesketh Bell, who took a deep interest in everything relating to the agriculture of the Colony, and who laid the foundation-stone of the College, should not have had the satisfaction of performing the present ceremony.

“ Apart from this, no more congenial task could have devolved upon me than that of opening an institution destined to play so important a part in the development of those resources on which the Colony is entirely dependent for its prosperity and progress.

“ The foundation-stone was laid in July 1923 and now, after the lapse of less than 2 years, the building stands practically complete a permanent witness to the foresight and liberality of those who conceived the project and provided the funds to carry it into effect.

“ Provision is made in the building for the training of young men not only in Agricultural Chemistry but also in general Agriculture, and the curriculum is specially adapted to the needs of the sugar industry of the Island.

“ This, in itself, is a great step in advance. For years the British Colonies and Protectorates have suffered from a dearth of highly qualified candidates suitable for appointment to the various posts in their Agricultural Departments and from the absence of facilities for the better training of those outside the Government service who are engaged in Agriculture. Steps are, however, being taken to remedy this defect. You are no doubt aware that a College of Tropical Agriculture has been recently established in Trinidad and I believe that a similar step is contemplated in one or two of the other Colonies, while the proof of this Island's enlightened and practical interest in the matter is here before us to-day.

“ But, important as is this question of providing better facilities
 “ for instruction in Agriculture, I am glad to think that the perhaps
 “ more important question of research will be kept steadily in
 “ view. In the address which the ‘Société des Chimistes’ pre-
 “ sented to me on my arrival they stated that their watchword
 “ was Research and I think that in the keen competition with
 “ other nations of the World which lies before the Empire it will
 “ have to be the watchword of all of us. There can indeed be
 “ little doubt that, so far as material development is concerned,
 “ the future lies with that country which has at its disposal the
 “ largest and most efficient body of original investigators and is
 “ best able to turn to account the results of their researches.

“ Someone has observed that most of the great catastrophes
 “ in the World’s history have been due to a failure to recognise
 “ some small evil which might have been satisfactorily dealt
 “ with in its early stages but had been allowed to attain unmanage-
 “ able proportions. In the domain of disease, whether of men,
 “ animals or plants, it would not be difficult to produce evidence
 “ in support of this remark and one of the best safeguards of a
 “ country’s resources is a wise research which is not content to deal
 “ with evils that have already reached serious dimensions but
 “ attempts to suppress them in their early stages or to forestall
 “ them altogether.

“ There is yet another direction in which we look for help from
 “ the College. Sugar is, and will, we hope, remain the staple
 “ industry of the Colony, but we are only too familiar with cases
 “ in which, from the operation of some new factor, important
 “ agricultural industries have declined and even disappeared
 “ altogether. It is therefore only common prudence to take
 “ stock of this country’s potentialities with a view to meeting
 “ contingencies of this kind.

“ In no country is the organization of its agriculture so perfect
 “ that it cannot be extended, and I hope and believe that, with
 “ the co-operation and good will of all concerned, it will be possible
 “ for us to set on foot some useful subsidiary industries, without
 “ detriment to the sugar industry which must be our first care.
 “ In this matter I am confident that the College will be able to
 “ render valuable assistance.

“ In conclusion let me say that, if an institution of this kind is
 “ to be successful, it is essential that there should be at the head
 “ of it a man who enjoys the confidence of the agricultural com-
 “ munity and who, in virtue of his enthusiasm and scientific
 “ attainments, is able to direct the efforts of those working with
 “ him along sound and progressive lines. Such a man the Govern-
 “ ment is fortunate enough to possess in Dr. Tempany, who has
 “ rendered eminent services to the planters of this country and to
 “ whose initiative the establishment of the College is largely due.
 “ With him and his able Advisory Committee at the head of
 “ affairs we need have no fear for the future.

PLATE I.

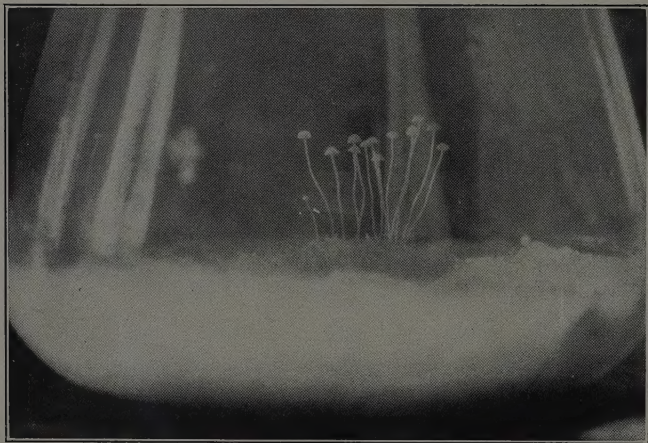


Fig. 1.



Fig. 2.

Fig. 1.—Group of agaric fructifications in a pure flask culture of *Stilbum flavidum* on bread and water. \times about 1.5.

Fig. 2.—Another culture on bread showing agarics and dense undergrowth of "*stilbum*" bodies. \times about 1.75.

Photos by F. W. URICH.

"I have great pleasure in formally declaring the Mauritius College of Agriculture open, and I am sure that you will all join with me in wishing it a long and prosperous career."

The College has issued a very useful prospectus and syllabus of instruction showing that they are prepared to meet the requirements of students in all branches of agriculture.

XXXIX.—THE PERFECT FORM OF *STILBUM FLAVIDUM* CKE. IN PURE CULTURE.

S. F. ASHBY.

The systematic position of the fungus causing the American Coffee-leaf Disease remained in doubt for many years following Cooke's description in 1880 of the reproductive bodies present normally on the leaf and berry spots.

In 1914, however, Maublanc and Rangel examining fresh material collected near Rio de Janeiro saw a small agaric develop from the spots on leaves of *Eriobotrya japonica* which had been lying in air saturated with moisture for some days. The same agaric appeared again under similar conditions on spotted leaves of species of *Melastomaceae* and *Compositae*. The leaves in question bore also the usual "*stilbum*" reproductive bodies of the fungus. The light sulphur yellow colour and certain microscopic characters were common to both forms and the authors claimed also to have found intermediate bodies connecting them. The agaric under the name *Omphalia flavida* was regarded therefore as the perfect fruit of the parasite and the following diagnosis was given :—

Minutissima, flavida : pileo tenui, membranaceo hemispherico-campanulato, vertice depresso vel subumbilicato, dein plus minusve aplanato, glabro, radiatim striatulo, margine acuta 1.5–2.5 mm. diam ; stipite setiformi, recto, tenui, concolori, minutissime velutino, circ. 1.5–3 cm. longo 0.25 mm. crasso, basi non incrassato ; lamellis paucis, sat distantibus, flavidis, subceraceis, triangularibus, utrinque attenuatis, plus minusve decurrentibus ; basidiis clavatis 14–17.4 x 5 μ ; sporis minutis, ellipsoideis vel ovoideis, basi apiculatis, hyalinis, non vel 1-guttatis 4–5 x 2.5–3 μ .

While the evidence afforded by these observers amounted to a strong probability that the two reproductive organs arose from one mycelium, definite proof of a common origin could be established only by means of pure culture. Kohl had shown that the fungus would grow in pure culture on sterilised peptone beef gelatine ; he obtained a vigorous mycelium which, however, remained sterile. In November, 1924, the writer took advantage of the presence of the disease on the variety of *Coffea arabica* cultivated with cacao in some of the valleys of the Northern Range in Trinidad,

to attempt the isolation of the fungus from freshly collected material. The attempt was successful and both reproductive bodies developed in the pure cultures. The following procedure was employed:—single drops of sterile water were placed in sterile petri dishes by means of a small sterile pipette and a platinum loopful of one per cent. sulphuric acid was mixed with each drop. Ripe "*stilbum*" heads were lifted from leafspots and one brought into a drop, moved about for a minute, and placed on solidified sterile corn-meal extract agar* in a petri dish. A radiate spreading growth of fine hyphae had developed from most of the heads in three days at room temperature (mean of about 79°F.), only two out of ten colonies being contaminated by bacteria. After four days when the colonies were nearly one inch in diameter transfers of segments were made to sterilised potato blocks, rice grains and bread. The growth on the plates consisted of fine branching septate hyphae, 1.5–3 microns in diameter, with frequent clamp connexions; very perfect tetrahedra of calcium oxalate were scattered in the agar below the colonies. Later a rather scanty floccose aerial mycelium developed at the centre of the colonies, which became zonate and showed minute white or pale yellow papillae scattered over the surface with a tendency to concentric arrangement. Later observations on tube cultures showed that these minute outgrowths were the early stages of the "*stilbum*" reproductive bodies. On potato and rice there was fair growth and reproductive bodies began to develop but remained imperfect and sessile. On bread, however, development was completed. This substratum was used because Westerdijk had recommended it for the culture of basidiomycetes. Two, three or four parts of water were added to one part fresh crumb of white bread, and 50 cc. portions in 250 cc. conical flasks were sterilised in the autoclave. In a flask containing the four to one mixture a white colony spread steadily round the inoculum at room temperature and after a few days became dotted with pale yellow "*stilbum*" initials which completed their development, forming a dense low forest extending from the centre almost to the margin of the colony. After twelve days a few much larger bodies, having deep yellow hemispherical heads, began to push up from the centre. In fifteen days some of them had become perfect agarics of a light sulphur colour with erect slender minutely hirsute stipes and membranous sub-hemispheric or broadly conical pilei. A transfer from a four weeks' potato culture, showing only undeveloped sessile reproductive bodies, to a flask of bread and water (1:4) resulted after ten days in an abundant production of the "*stilbum*" form and a score of agarics, some with fully developed pilei and others with compact brownish-yellow hemispheric buttons on

* *Corn-Meal Extract Agar*.—The medium was prepared by extracting 50 grams of imported corn meal with one litre of water in the water bath at a temperature between 55°C. and 60°C., and filtering off the extract. Fifteen grams of Bacto agar were dissolved in the filtrate by boiling; it was then passed through muslin and sterilised in the autoclave for 20 minutes at a pressure of 12 pounds.

stipes of normal length ; these buttons failed to expand and complete their development. Subcultures were made, from this original growth, on to sterilised mixtures of three and four parts water to one part of bread in flasks using, as inoculum mycelium, stilbum heads and fragments of the stipes or pilei of the agarics ; fully developed reproductive bodies of both kinds were obtained in these sub-cultures.

Basidiospores have been developed very scantily in the pure cultures ; on two occasions fully expanded pilei allowed to lie in sterile water for a day shed a few spores, some of which were germinating ; they conformed in size and shape to the description of Maublanc and Rangel. Platings were made with the spores in corn-meal extract agar and a few colonies developed which were of the normal type. Subcultures on corn meal agar and bread yielded in most cases sterile mycelium. One such culture, however, on a corn-meal agar slope in a tube 7 inches long and 1 inch in diameter developed, after three weeks, five perfect agarics and many stilbum bodies at the apex of the slant. There was no deposit of moisture in the tube, which stood in the rather dry air of the laboratory. Fully developed fructifications of both kinds have been obtained also on corn-meal agar slopes in wide tubes by planting entire agarics from a pure culture. Both reproductive forms have also developed to maturity in cultures on bread in flasks kept in the dark in the refrigerator at a temperature varying from 18°-24° C. ; the colour was as marked as in cultures in diffuse daylight.

In pure culture the perfect sporocarps are 1-1.5 cm. in height, the pilei 2-3½ mm. in diameter and about 1.5 mm. in depth. The light sulphur yellow, slender, erect stipe broadens slightly from base to apex with a diameter of 0.2-0.3 mm., and is clothed with unicellular irregular pointed hairs, 50-70 microns in length ; it appears to be hollow with a loose web of internal hyphae. In bread cultures it is slightly enlarged at the base, but appears to arise with no enlargement directly from the recumbent mycelium on corn-meal agar. The fully expanded very pale sulphur-yellow, membranous, and almost glabrous pileus is sub-hemispheric or broadly conical and furrowed above the lamellae, with an undulate margin dentate at the ends of the lamellae ; there are about twelve primary triangular lamellae sharply decurrent on the stipe ; occasionally one is forked ; they alternate with an equal number of short secondary lamellae which do not reach the stipe ; the spores are oval, hyaline, with one end pointed, and 4-5 by 2.5-3 microns ; basidia have not been seen. The sporocarp agrees in all essentials with the description of Maublanc and Rangel.

The stilbum reproductive bodies in pure culture have the form and structure of those in nature. They are 2.0-2.5 mm. in height with heads 0.25-0.33 mm. in diameter. Puttemans has fully described and illustrated the development form and structure of this body and the writer is in agreement with him. It arises from a dome-shaped outgrowth, the stalk pushing up from the

centre, leaving a sheath of loosely investing hyphae at its base. In bread cultures the primary stilbum heads frequently give rise to secondary stalked heads, six or more arising from one cap and resulting in two tiers of growth. They may arise also from the stipe and pileus of the perfect fructification. Many stilbum heads from pure cultures and from leaf and berry spots have been examined for sporulation, but no spores have been found; the enlarged peripheral end-cells have been seen to give rise only to hyphae in water and on culture media. Intermediate forms between the two reproductive bodies have not been found in pure culture. The development seems quite distinct from an early stage, so that the stilbum body has the appearance of being an independent specialised reproductive organ rather than an aborted form of the perfect sporocarp. As Kohl and Fawcett have demonstrated, infection arises from the entire heads detached from the stalks, and on spots which are not weathered the infecting head can be found at the centre. Attempts to get the perfect fruiting form to develop from leaf spots on coffee in Trinidad and from spots on a number of species of plants growing among the coffee bushes, by maintaining the leaves under conditions of differing humidity, have met with no success.

Recently Avena-Sacca has recorded the occurrence of a leaf, berry and twig spot of coffee in Sao Paulo, Brazil, associated with the conidial synnemata of a *Stilbella* having spherical vermilion spore heads. Although perithecia were not seen, he referred this fungus to *Sphaerostilbe flavida* Mass., citing *Stilbum flavidum* Cke., *Stilbella flavida* Kohl and *Omphalia flavida* Maubl. & Rangel as synonyms. It is evident that the conidial fruiting body described by him had nothing in common with the stilbum body of the American Coffee-leaf Disease, and it is not clear from his account that he was dealing even in part with that disease.

As *Stilbum flavidum* Cke. is a basidiomycete it is evident, moreover, that the combination *Sphaerostilbe flavida* Mass. is untenable.

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* Kindly translated by M. Aspiazu, a student of the Imperial College of Tropical Agriculture, Trinidad.

XL.—DECADES KEWENSES

PLANTARUM NOVARUM IN HERBARIO HORTI
REGII CONSERVATORUM.

DECAS CXII.

1111. *Viscum mysorense* Gamble [*Loranthaceae*]; species ramulis angulatis vel complanatis *V. angulato* Heyne et *V. articulato* Burm. affinis sed foliis munita et siccitate conspicue flavescens.

Arbuscula parasitica ramulis pendentibus flavescens, ad nodos dichotome divisus, internodiis angulatis vel complanatis striatis. *Folia* sparsa, opposita, oblanceolata, tricostata, vix petiolata, 3–4 cm. longa, 5–10 mm. lata. *Flores* in glomerulis parvis trifloris ad axillas foliorum vel ad nodos superiores, medius ♀ laterales duo ♂. *Perianthii lobi* 4, ovati, acuti. *Stamina* plana, perianthii lobis medio dorso affixa, multiporosa. *Fructus* ignotus.

S. INDIA. Mysore; Arsikere, 600 m. alt., Feb. 1908, A. Meebold 8207.

1112. *Phyllanthus Narayanswamii* Gamble [*Euphorbiaceae-Phyllanthaeae*]; species inter *P. Rosperianum* Wall. et *P. simplicem* Retz, ab utraque distincta foliis parvis conspicue nervosis et capsula verrucosa.

Frutex nanus, lignosus, glaber, ramulis multis gracilibus complanatis e radice crasso ortis. *Folia* parva, coriacea, disticha, elliptica, obtusa, minute apiculata, 5–10 mm. longa, ad 5 mm. lata, margine crasso, nervis 4–5 conspicuis arcuatis junctis; petiolus minimus; stipulae paleaceae, peltatae, hastatae. *Flores* in fasciculis axillaribus, ♂ subsessiles, ♀ pedicellis 2–3 mm. longis. *Perianthii lobi* 6, oblongi, ♂ et ♀ similes subhyalini. *Discus* in ♂ e glandulis 6 rotundis, in ♀ patelliformis. *Stamina* 3, libera, antheris globosis transversim dehiscentibus. *Ovarium* stylis 3 patentibus bifidis. *Capsula* globosa, paullo depressa, verrucosa. *Semen* dorso minute glandulosum.

S. INDIA. Rampa hills, Godavari, Dummakonda, 1300–1400 m. alt., Oct. 1920, V. Narayanswami 640.

1113. *Pseudoglochidion* Gamble gen. nov.

Genus inter *Phyllanthaeas Glochidio* affine ob stamina 3 filamentis in columnam connatis, sed maxime differt disco conspicuo. A *Phyllantho* vero calycis lobis 6 nec 5 in utroque sexu differt.

Arbores vel *frutices* sempervirentes. *Folia* alterna, bifaria, integra, brevissime petiolata. *Flores* parvi, dioici, in glomerulis axillaribus. *Calyx* in floribus masculis lobis 6 biseriatis imbricatis, in floribus femineis etiam lobis 6 sed minoribus. *Petala* 0. *Discus* in floribus ♂ conspicuus e glandulis 6 fimbriatis calycis lobis oppositis, in floribus ♀ annularis, crenatus. *Stamina* 3, erecta, fere libera vel connectivis paullo junctis;

filamenta in columnam brevem conjuncta; antherae extrorsae thecis longitudinaliter dehiscentibus; connectivum in apiculum productum. *Ovarium* ovoideum, 3-loculare, ovulis in quoque loculo 2; styli in columnam minute 6-dentatam connati. *Capsula* 3-4-locularis, apice depressa. *Semina* trigona, dorso rotundata, punctata.

Pseudoglochidion anamalayanum Gamble [*Euphorbiaceae-Phyllanthae*].

Arbor parva vel frutex erectus, ramulis pallidis gracilibus. *Folia* chartacea, bifaria, lanceolata, apice acuta, basi attenuata, supra glabra, subtus glauca, 4-9 cm. longa, 1.5-3 cm. lata, nervis primariis regularibus utrinque 8-12; stipulae minutae, subulatae, caducae; petiolus brevis, vix ad 3 mm. longus. *Flores* in glomerulis paucifloris axillaribus; pedicelli ♂ filiformes, circiter 5 mm. longi, ♀ brevissimi. *Calycis* lobi ♂ 6, ovato-lanceolati, erecti, glabri, 2-3 mm. longi, ♀ breviores. *Petala* 0. *Discus* in ♂ glandulis 6 conspicuis apice fimbriatis, in ♀ annularis, crenatus. *Stamina* 3, erecta, lanceolata, apice apiculata. *Ovarium* 3-loculare stylis in columnam apice dentatam conjunctis. *Capsula* 3-4-loba, glabra, 7-8 mm. lata, apice depressa. *Semina* dorso villosa, curvata, 3-4 mm. longa, ad latera punctata.

S. INDIA. Anamalai hills, Monica, 1300 m. alt., Oct. 1901, C. A. Barber 3807; Aiyarpadi, March 1912, C. E. C. Fischer 3301 (type).

1114. **Glochidion Bourdillonii** Gamble [*Euphorbiaceae-Phyllanthae*]; *G. elliptico* Wight affinis, foliis ovatis vel obovatis conspicue reticulatis insignis.

Arbor parva ramulis glabris. *Folia* glabra, ovata vel obovata, breviter et saepe obtuse acuta, basi plus minusve cuneata inaequalia, 4-10 cm. longa, circiter 3 cm. lata, subtus pallida subglauca, nervis primariis utrinque 5-7 obliquis, marginem versus arcuatim junctis, nervulis transversalibus conspicuis subparallelis; petiolus brevis, 5 mm. longus. *Flores* in glomerulis axillaribus, ♂ pedicellis gracilibus, ♀ sessilibus. *Calycis* lobi ♂ oblongi, patentes, 2-3 mm. longi, ♀ ovati, multo breviores. *Stamina* 3, connectivo curvato producto. *Styli* 5, imprimis brevissimi, deinde elongati et in columnam cylindricam juncti. *Capsula* ignota.—*G. rigidum* Bourd. Trav. Trees 334; Brandis Ind. Trees 574 not of Muell. Arg.

S. INDIA. Evergreen forests of Travancore, up to about 1000 m. alt., in ravines and near streams, T. F. Bourdillon 560, 1616 (type).

1115. **Emblica Fischeri** Gamble [*Euphorbiaceae-Phyllanthae*]; species inter *E. officinalem* Gaertn. et *E. albizzioide*m (Kurz) Gamble quoad folia intermedia, a priori etiam florum ♂ glandulis majoribus et stylium lobis angustioribus differt.

Arbor ramis brunneis striatis lenticellatis ultimis angulatis; ramulis gracilibus foliiferis cito deciduis puberulis, ad circiter 15 cm. longis. *Folia* oblongo-elliptica, apice obtusa vel retusa,

basi cordata, 15–20 mm. longa, 5–7 mm. lata, 3–5 mm. inter se distantia, in quoque ramulo circiter 20–50, subtus glaucescentia, nervis utrinque 5–6; petiolus brevis, 1–2 mm. longus; stipulae minimae triangulares. *Flores* in fasciculis axillaribus e bracteis parvis rufescentibus orti, pedicellis filiformibus, ♂ quam ♀ multo numerosiores et pedicellis paullo longiores. *Calycis lobi* obovati vix 2 mm. longi. *Discus* ♂ e glandulis orbicularibus 6, ♀ cupuliformis paullo dentatus. *Stamina* 3, filamentis in columnam gracilem connatis, antheris oblongis minute apiculatis. *Ovarium* globosum, 3-lobum, stylo longo gracili, lobis 3 gracilibus bifidis reflexis. *Fructus* adhuc ignotus.

S. INDIA. Anamalai hills, Poonachi road, April 1908, *C. A. Barber* 8410; hills of Coimbatore, Dhimbam, 1000 m. alt., Dec. 1910, *C. A. Barber* 8628; Gairmalam, March 1906, *C. E. C. Fischer* 926; Kambakam hills, Chingleput, May 1913, *K. Rangachari* 9000 (type); Veligonda hills, Nellore, July 1914, *M. S. Ramaswami* 1419.

1116. **Reidia Beddomei** Gamble [*Euphorbiaceae-Phyllanthae*]; *R. macrocalyci* (Muell. Arg.) Gamble affinis, calycis lobis fructiferis minoribus, disco in ♂ lobato in ♀ patelliformi, foliis ovatis subtus glaucis differt.

Suffrutex erectus, glaber, ramulis apicem versus congestis rufo-brunneis, stipulis minutis. *Folia* membranacea, disticha, ovata, acuta, basi obtusa aequalia, subtus glauca, 3–5 cm. longa, 2–3 cm. lata, nervis primariis utrinque 7–8 inconspicuis; petiolus 2 mm. longus. *Flores* ♂ et ♀ ex axillis foliorum, ♂ inferiorum pedicello 10–12 mm. longo, ♀ superiorum pedicello ad 2 cm. longo superne incrassato. *Calycis lobi* ovati, pellucido-striati, ♂ ad 8 mm. longi, ♀ ad 8 mm. *Discus* in floribus ♂ e lobis 4 late obovatis punctatis, in ♀ patelliformis punctatus margine crenatus. *Stamina* filamentis brevibus conjunctis, antherarum ramis horizontalibus. *Stigmata* patentia bifida. *Fructus* maturus nondum repertus.

S. INDIA. Chokampatti hills, Tinnevely, 1600 m. alt., *R. H. Beddome* (type); Hills of Travancore, July 1898, *T. F. Bourdillon* 89.

1117. **Reidia Gageana** Gamble [*Euphorbiaceae-Phyllanthae*]; *R. fimbriatae* Wight affinis, calycis lobis ♂ et ♀ angustioribus magis laceris, foliis minoribus, subtus glaucis differt.

Suffrutex gracilis, ramulis apicem versus congestis patentibus, stipulis parvis lanceolatis munitis. *Folia* membranacea, disticha, ovato-lanceolata, acuta, basi inaequalia, subtus glauca, 2–5 cm. longa, 1–2 cm. lata, nervis primariis utrinque circiter 6–8; petiolus vix 3 mm. longus. *Flores* ♂ in parte inferiori ramulorum glomerati e bracteis parvis imbricatis, pedicellis gracilibus; ♀ ex axillis foliorum superiorum. *Calycis lobi* angusti, lanceolati, profunde laceri, in ♂ magis quam in ♀, vix 2 mm. longi. *Discus* e glandulis 4 rotundis. *Stamina* 4, subsessilia, horizontaliter dehiscentia. *Fructus* ignotus.

S. INDIA. S. Tinnevely, 1873, *R. H. Beddome* (type); Colatoorpolay, Travancore, 650 m. alt., Nov. 1893, *M. A. Lawson* 335.

1118. **Reidia megacarpa** Gamble [*Euphorbiaceae-Phyllanthaeae*]; *R. Gageanae* Gamble et *R. fimbriatae* Wight affinis, sed calycis lobis non laceris, margine solum dentatis et capsula magna.

Suffrutex erectus, glaber, ramulis apicem versus congestis, stipulis lanceolatis conspicuis 3–5 mm. longis. *Folia* membranacea, disticha, ovato-lanceolata, acuta et mucronata, basi paullo inaequalia, subtus glaucescentia, 3–7 cm. longa, 1.5–3.5 cm. lata, nervis primariis utrinque circiter 8–10; petiolus 2–3 mm. longus, facile solutus. *Flores* ♂ pauci ex axillis foliorum inferiorum, bracteis paucis suffulti, et pedicellis brevissimis muniti; ♀ solitarii ex axillis foliorum superiorum, pedicellis gracilibus 13–15 mm. longis. *Calycis lobi* orbiculares-ovati, dentati, rubri, 2–3 mm. longi. *Discus* in floribus ♂ e 4 glandulis reniformibus complanatis, in ♀ pulvinaris crassus. *Stamina* 4, subsessilia, *Stigmata* patentia, bifida. *Capsula* obovata, 2–3 cm. lata, pericarpio crustaceo cito rumpenti. *Semen* trigonum, dorso rotundatum, parce villosum, fere 5 mm. longum.

S. INDIA. Nilgiris; S.E. Wynaad, Devala, 1000 m. alt., Nov. 1884, *J. S. Gamble* 15547 (type); Wynaad, 1866, *R. H. Beddome*.

1119. **Reidia stipulacea** Gamble [*Euphorbiaceae-Phyllanthaeae*]; *R. floribundae* Wight affinis foliis multo minoribus ovato-falcatis apiculatis, calycis lobis brevibus late ovatis pellucido-punctatis differt.

Suffrutex erectus, ramulis apicem versus congestis patentibus, ramis nigris stipulis parvis lanceolatis multis conspicuis ornatis. *Folia* parva, oblique ovato-falcata, acuta et longe apiculata, subtus pallida hispida, 5–10 mm. longa, ad 5 mm. lata, nervis primariis utrinque 5–6 inconspicuis. *Flores* axillares, ♂ e mediis ♀ ex ultimis nodis; pedicelli graciles, ♀ longiores, superne paullo incrassati. *Calycis lobi* late ovati, glabri, pellucido-punctati. *Discus* e glandulis obovatis, complanatis, punctatis. *Ovarium* dense villosum, stigmatibus bifidis. *Capsula* oblonga, depressa, villosa, 5 mm. alta.

S. INDIA. Anamalai hills, 1500 m. alt., *R. H. Beddome*; Pulney hills, Shola, edge of Pambar stream in thick undergrowth, June 1899, *Sir A. G. & Lady Bourne* 1330 (type).

1120. **Ficus Angladei** Fischer [*Moraceae*]; species sectionis *Urostigma* *F. Beddomei* King affinis, foliis minoribus basi acutis nervis minus conspicuis, bracteis receptaculi ad basim binis deciduis, floribus in receptaculo sessilibus differt.

Arbor ramulis ultimis albo-pubescentibus exceptis glaber. *Folia* alterna, coriacea, elliptico-lanceolata vel late elliptica, apice et basi attenuata, apiculo obtuso, 9–12 cm. longa, 4.5–7 cm. lata, siccitate pallide viridia, subtus brunnea; costae e basi 3,

media supra canaliculata subtus prominens. nervi primarii utrinque circiter 15, curvati et prope marginem integram cartilagineam juncti, secundarii irregulares reticulationem minute areolatam cingentes; petioli 5–8.5 cm. longi, siccitate complanati et longitudinaliter sulcati. *Receptacula* in axillis foliorum bina, juventute rufo-fulva, matura subglobosa brunnea nigro-punctata paullo costata, circiter 18 mm. longa, 16 mm. lata; bracteae 2, cucullatae, albo-pubescentes; pedunculus crassus, 12–16 mm. longus, 3–4 mm. diametro. *Flores* ♂ et ♀ per paria passim in receptaculo squamis fuscis ensiformibus mixti; ♂ 2–3 mm. longi perianthii lobis 3 liberis ovatis vel spathulatis fulvis; ♀ quam ♂ breviores, perianthii lobis 4 liberis acuminatis. *Stamen* filamentum subsessile vel longo, antherarum thecis orbicularibus. *Ovarium* minutum, hemisphaericum, lateraliter complanatum, stylo excentrico et stigmate elliptico-lanceolato.

S. INDIA. Lower Pulney Hills, Madura, 900 m. alt., Aug. 1922, *Rev. L. Anglade* 1018.

XLI.—SOLANUM MACROCARPON.

I. H. BURKILL.

Solanum macrocarpon Linn., a pot-herb of Africa, is found to be widely cultivated in that continent, whence it has been taken both east and west. The leaves are used as a vegetable, and the fruits, although bitter, are sometimes eaten as food. The History of this plant is as follows:—

The learned pharmacologist Giacomo Zanoni, who died in 1682, recorded that he had received, presumably in Bologna, from Philip Donnini, chief of the ducal garden at Florence, seeds of a *Solanum*, which, growing satisfactorily and flowering, furnished him with the materials for a drawing, labelled *Solatropomifero non spinoso*, and this drawing was published under the editing of Gaetano Monti in 1742 (*Jacobi Zanoni rariorum stirpium historia*, plate 158), along with a description, on p. 206, under the name of *Solanum spinis carens melongenae facie fructu rotundo*. It is not possible to state how the plant reached Florence; but Zanoni grew it as an annual: it flowered in August and fruited in November, bearing a yellow fruit, like an apple or of the size of the yolk of a fowl's egg. This plant is called No. 1 below.

Between 1689 and 1697, the French priest, Charles Plumier, travelled in the West Indian Islands, collecting information on plants, and getting together a series of drawings. Upon his return to France he issued in 1703, under the title of *Catalogus plantarum americanarum*, a list of these, wherein (p. 4) is recorded one, diagnosed as *Lycopersicon arborescens amplissimis foliis angulatis, fructu aureo*. This plant is called No. 2 below.

Not many years afterwards, another priest, Louis Feuillée, made observations down the west coast of South America, and in

what he published is to be found an account and a figure of a species, called by him *Solanum amplissimum, angulosum, hirsutumque folio, fructu aureo maximo* (Histoire des plantes médecinales de Perou et Chily, 1725, p. 61, plate 46). This plant is called No. 3 below.

In 1727, in Sherard's garden at Eltham, the seed of a *Solanum* was sown, which had been taken from a fruit brought to Britain from Buenos Aires. Dillen, in describing the plants of the garden, called this *Solanum Bonariense, arborescens, Papas floribus*; and he figured it (Hortus Elthamensis, 1732, p. 364, plate 351). This plant is called below No. 4.

Lastly, Philip Miller described and figured a species "very lately introduced from India, . . . not mentioned by any botanic writer," under the name of *Solanum, caule inermi subfruticoso foliis oblongo-ovatis sinuatis utrinque glabris floribus alaribus* (Figures of plants in the Gardeners' Dictionary 2, 1759, p. 196, plate 294). This plant is here called No. 5.

Linnaeus in his *Species plantarum*, ed. 1, 1753, vol. 1., p. 185, named No. 4 as *Solanum bonariense*. Burmann, editing Plumier's drawings, erroneously declared No. 2 to be identical (*Plantarum americanarum fasciculus nonus*, 1759, p. 219, plate 224). Linnaeus in his *Mantissa altera*, 1771, p. 205, gave the name *Solanum macrocarpon* to No. 5, and erroneously identified Nos. 2 and 3 with it. Houttuyn in 1778 (Des von Linné's *Pflanzensystem*, 3, p. 211), building upon Linnaeus, issued an account of *Solanum macrocarpon* based entirely upon No. 3. Gouan, who tells us in his *Illustrationes et Observationes botanicae*, of 1773, that for ten years he had been studying in the Botanic Garden of Montpellier the plants he was about to describe therein, identified No. 1 with a plant which he had been growing, under the name of *Solanum Zanoni* (p. 7). Aiton in 1789 (*Hortus Kewensis*, i., p. 248) correctly withdrew No. 3 from *S. macrocarpon*; and Lamarck in 1793 (*Tableaux Encyclopédique*, 2, p. 16) gave to it the name of *Solanum quitoense*. Twenty-three years later, Jacquin, ignoring Lamarck's application of the last name, used *Solanum Feuillei* for No. 3 and applied the new name of *Solanum Plumieri* to No. 2 (*Eclogae plantarum rariorum*, i., 1816, p. 124). Long afterwards, Dunal, who must have overlooked Jacquin's use of *S. Feuillei* and *S. Plumieri*, applied the first name to another species, and the second name, in this case, if fortuitously, at least fortunately, to the species already so named (De Candolle, *Prodromus*, 13, pt. i., p. 309).

In this way all the five plants, of which four had been diversely confused with each other, got separate Linnean names. It does not follow that from the time of obtaining names they were kept distinct. Thus, for instance, Willdenow in his *Linnaei Species Plantarum*, 1, pt. 2 (1798), disregarded *S. quitoense*, and everyone disregarded *S. Zanoni*. But the names had come into existence. No. 1 had got the name of *S. Zanoni*, but will be seen later to be the same as No. 5; No. 2, which, as Urban says in his *Plumiers*

Leben und Schriften (Fedde, Repertorium specierum, Beihefte 5, 1920, p. 90), remains obscure, had got the name of *S. Plumieri*: No. 3, the source, or at least one source, of the Naranjitas de Quito, that of *S. quitoense*; No. 4 of *S. bonariense*; and No. 5 of *S. macrocarpon*.

In early writings, by a common looseness of expression, both the East and West Indies were denoted by the word Indies or India; but in the time of Miller that looseness had passed away, and certainly Miller was not guilty of it. Nevertheless the plant which Miller had recorded as from India, having been mis-identified with plants from the Western Hemisphere, was, by the best of the botanists who followed him, ascribed to America, and in particular to Peru.

Solanum macrocarpon became quite well known in European gardens from Miller's introduction.

Zanoni's plate abundantly proves that it was in Italy in botanic cultivation in the seventeenth century. Then it disappears from sight, and is not to be detected again until 1759, when Miller got it. Next there is evidence that it was at Montpellier between 1763 and 1773, where it served Gouan for a description, and whence a specimen has been preserved, now in the Kew Herbarium. Gouan, however, had not mentioned it in his Catalogue of 1762 (*Hortus regius Monspelienensis*). There is evidence that, after this date, it was frequently in cultivation, and always under the name of *S. macrocarpon*—never as *S. Zanoni*; and that it was not difficult to maintain either in a stove in the colder parts of Europe or in the open air in the Mediterranean. Aiton's *Hortus Kewensis* of 1789, i., p. 248, records it in the Royal Gardens at Kew, and as flowering through the greater part of the summer. It was grown by Salisbury in his garden at Chapel Allerton, near Leeds, before 1796, and in his *Prodromus Stirpium*, 1786, p. 133, he put forward the name *Solanum crassifolium* for it, as one more apt, in his mind, than *S. macrocarpon*. Donn records it for the Botanic Garden at Cambridge from 1811 to 1845 (that is to say in all the editions of his *Hortus Cantabrigiensis* from the sixth to the thirteenth), kept in a stove and flowering from June forward. Sweet, in his "Catalogue of plants grown in the neighbourhood of London," 1818, p. 42, states that it flowered from May to September under heat; and similar statements are in his *Hortus britannicus* of 1827, 1830 and 1839. In the second of these he adds the words, flowers blue.

Du Mont de Courset records it in his *Le botaniste cultivateur*, 1811, vol. 3, p. 158, implying that it was then grown in Paris: and the Herbarium at Kew possesses a specimen from the Jardin des Plantes, Paris, gathered in 1815. Desfontaines, again, recorded it in his *Catalogus plantarum Horti Regii Parisiensis*, 1829, p. 114.

In gardens subjected to more vigorous winters it was also to be

found ; for instance it appears to have been grown at Copenhagen under Hornemann (*Hortus Regius Hafniensis*, 1813, p. 218) ; at Berlin under Willdenow (*Enumeratio plantarum Horti Regii Botanici Berolinensis*, p. 235), and under Link (*Enumeratio plantarum Horti Regii Botanici Berolinensis altera*, i. 1821, p. 183) ; in Breiter's garden at Leipzig (*Hortus Breiterianus*, 1817, p. 491) and at Bonn under Nees (*Elenchus plantarum horti botanici Bonnensis*, 1820, p. 55). It was in Vienna in 1816 (Jacquin, *Eclogae plantarum rariorum*, p. 124). Further east, Pallas recorded it as in the garden of Prince Demidoff in 1781 (*Enumeratio plantarum Horti Demidoff*, p. 28) ; Fischer, as in the garden of Count Alexis de Razoumoffsky at Gorenki, near Moscow (*Catalogue du Jardin des Plantes de Alexis de Razoumoffsky*, 1812, p. 26) ; Schweigger, as in the Königsberg garden (*Enumeratio plantarum Horti botanici Regiomontani*, 1812, p. 67) ; Buck and Pursh, as in the garden of Count Orloff at his seat near St. Petersburg (*Hortus Orloviensis*, 1815, p. 62) ; Besser, as at Kremnitz in Hungary (*Catalogus plantarum in Horto botanico Cremeneci*, 1816, p. 134). Moscow offered seeds of it under Meyer and Fischer in 1839, 1841 and 1842 (*Index seminum*, sextus, p. 34, octavus, p. 42, and nonus, p. 45) ; its omission in other years suggesting an irregularity of fruiting.

It has been remarked that it will grow out of doors in the Mediterranean. It is to be added that it fruits in one season, and can therefore be treated as an annual. In fact, Zanoni called it an annual, though Gouan called it a perennial, and it certainly fruits in its first year in the gardens of negroes of Africa. A century or so ago it appears to have been in the following Gardens :—in 1813 at Turin (*Catalogus stirpium Horti Academiae Taurinensis*, p. 73) ; Naples (*Catalogus plantarum Horti Regii Neapolitani*, p. 100) and Montpellier (De Candolle, *Catalogus plantarum Horti botanici Monspelienensis*, p. 63). It was recorded again for Turin in 1821 (*Catalogus*, p. 53) ; for Palermo in 1827 (Tineo, *Catalogus plantarum Horti Panormitani*, p. 242) ; for Padua in 1842 (*L'Orto botanico di Padova*, p. 120) and Milan (Manetti, *Catalogus plantarum Caesarei Regii Horti prope Modiciam*, p. 42).

Every one of these catalogues which adds countries of origin asserts this plant to have come from Peru. One catalogue stands out among the rest—Link's—and this in stating the corolla to be white. Though the remark leads to an enquiry for the introduction of the plant anew, in a white-flowered race, the fact that such would almost certainly have caused the real country of origin to have been made evident renders a new introduction improbable ; and one concludes that if Link's plant was really white-flowered, it was so by sporting.

The error as to its country of origin continued through Dunal's first two works upon the *Solanaceae* (*Histoire naturelle, médicale et économique des Solanum*, 1813, p. 144, and *Solanorum generumque affinium synopsis*, 1816, p. 10).

Two further names for *S. macrocarpon* occur. The traveller Thonning in 1807 sent from Guinea to the Botanic Garden in Copenhagen seeds which grew ; and later a further supply of plants was raised in Vienna, wherefrom Jacquin, the younger, described and figured *Solanum Thonningianum* (*Eclogae plantarum rariorum*, i, 1816, p. 123, plate 83). Thonning's dried plants and manuscript notes subsequently supplied Schumacher with materials for his *Solanum Atropo* (*Beskrivelse af Guineiske Planter*, 1827, p. 124), or as called by him, in the Kongelige danske Videnskabernes Selskabs, *Afhandl.* 3, p. 144, according to Walpers and others, *Solanum Atropae*. Thonning, quoted by Schumacher, had recorded that the plant was called Kva-Fyé, and its fruit Atropo, the fruit supplying the negroes with a relish, while the leaves afforded good greens, being cooked in the same manner as the fruit. The flower he described as pale blue, and the fruit as dirty yellow in colour and of the size of an apple.

Without any doubt, *S. Thonningianum* and *S. Atropo* are one and the same thing ; and it is certain that the two names have to be reduced as their species is *S. macrocarpon*.

Apparently the stock which received the name of *S. Thonningianum* did not persist in cultivation.

In the year 1820 the Bohemian botanist, Wenceslaus Bojer, went out to the Mascarene Islands ; and his collections from Madagascar, as well as those of his friend and colleague, Louis Bouton, from Mauritius, revealed that *S. macrocarpon* exists wild in those parts. Dunal accepted the evidence ; and in his last work upon the *Solanaceae* (*De Candolle, Prodrômus*, 13, part i., 1852, p. 353), he brought *S. Thonningianum* next to, but did not unite it with *S. macrocarpon*. By inadvertence he inserted a reference to Bojer's *Hortus Mauritianus* (of 1837), but Bojer, apparently, at that date had not got a determination for the plant.

Europe supplied *S. macrocarpon* presumably to N. America, and probably to other places. Loudon tells us that William Hamilton, of the Woodlands, near Philadelphia, in the United States of America, was believed "to have the most complete garden in the United States . . . not only of all the plants of America, but those of Europe and other parts of the world, which were considered of interest either for arts or medicine" (*Arboretum et Fruticetum Britannicum*, i., 1838, p. 181). This William Hamilton was a correspondent of Roxburgh's and sent to him in the early days of the Honourable East India Company's Garden in Calcutta seeds of many plants, including seeds of *S. macrocarpon* (*Hortus bengalensis*, 1814, p. 16). Voigt, in his *Hortus Suburbanus Calcuttensis*, 1845, p. 510, recorded that in Lower Bengal it produced its large blue flowers all the year round.

It seems to have disappeared from India subsequently ; and interest in the plant languished in Europe.

Clearly there had been available to Linnaeus some information of its utility, for in his accurate Latin he applies the adjective "oleracea" to the leaves. But after him no one called attention

to their use as 'greens.' Yet it must have been an idea of its utility that, in 1875, led to the inclusion of the species in Ferdinand v. Mueller's "Select plants readily eligible for Victorian Industrial Culture," p. 145; but while there is no mention of the nature of its use, the reader, from the mention of the size of the fruits, is led to gather that it should be grown for them. Von Mueller's statement contained, also, a mention of this plant under the synonym of *S. Thonningianum* (erroneously as *S. Thonningii*); and the entries in subsequent editions of his book were the same until the French edition of Naudin and v. Mueller (*Manuel de l'Acclimateur*, 1887, p. 500), where the edibility of the fruit as regards *S. Thonningianum* was accentuated.

Probably it was Naudin's and von Mueller's *Manuel* that led Paillieux to experiment with *S. macrocarpon*; but when he sought for seed, he sent to Mauritius for it. The seed grew in his garden near Paris, but did not produce fruits (Paillieux and Bois, *Potager d'un Curieux*, 1892, p. 194.) However, in 1891 M. Cornu sent to Paillieux seed of an unnamed *Solanum* from the Gabun, reported as having an edible fruit, and this *Solanum*, which grew and fruited, was found to be *S. macrocarpon*. Friends of his at Temple-sur-Lot, in south-western France, and M. Daveau in Lisbon found it to fruit still more generously in their warmer climates. Though Paillieux and Bois do not mention the colour of the Gabun fruits, from what they wrote it is to be inferred that they were yellow. Paillieux found the fruit bitter. There are other species of *Solanum* in Africa of which it is recorded that the outer part of the fruit is not too bitter for food, whereas the inner is so. The bitterness of the different parts of *S. macrocarpon* has not been discussed. Paillieux's remark on its small size provides us with a possible reason why Jacquin's figure under the name *S. Thonningianum* exhibits a small fruit.

Other names are also recorded for the species. In 1894, the seedsmen Dammann and Co. obtained, from the African traveller Stuhlmann, seed of a *Solanum*, which they put upon the market under the unreasonable and sensational name of *S. Mors-elephantum*. It was figured in the firm's catalogue No. 70, 1894, p. 100, figure 81, and in the *Wiener Gartenzeitung* for 1894, p. 29, figure 7. Grown at Kew, it was determined to be nothing else than *S. macrocarpon*, which by this means was shown to be African as well as Mascarene. *S. Mors-elephantum* exhibited large violet flowers and yellow fruits, both typical of *S. macrocarpon*. *S. macrocarpon* is in the List of tender Dicotyledons in the Royal Botanic Gardens, Kew, 1899, p. 625, and in Berger's *Hortus Mortolensis*, 1912, p. 301; and it is certainly available in Europe.

Souèges, in the *Annales des sciences naturelles*, series 9, 6, 1907, pp. 7 and 81, uses a name *Solanum dens-elephantis* Hort. for a plant which may have been this; but he found some difference between the structure of its seed-coats and those of what he had as *S. macrocarpon*. The former he had from the Villa Thuret at Antibes, and the latter from the Museum at the

Jardin des Plantes in Paris. This plant came into cultivation in the Botanic Garden at Tokyo, and on the supposition that it came from Formosa, Matsumura described it as a new species under the name of *Solanum dimorphum* in the Tokyo Botanic Magazine, 15, 1900, p. 56. He calls the corolla "pale."

Dr. G. Bitter has recently given an account of this plant (Fedde's Repertorium specierum novarum, Beihefte 16, 1923, p. 195); and it is gratifying, after struggling through such confusion as has been indicated, to find so much clarity introduced, that his localities for it may be accepted without hesitation. He divides the species into unequally ranking subdivisions, as follows:—

S. macrocarpon var. *calvum*, no hairs or bristles anywhere, except minute stalked glands on new growths. Possible sub-variety with flowers solitary—

forma *megistocalyx*, large calyx.

var. *parcesetosum*, straw-coloured bristles on stem, petioles, midribs, etc.

var. *columnaristellatum*, stellate hairs similarly disposed.

var. *setosociliatum*, more obviously setose than var. *parcesetosum*.

var. *primovestitum*, still more hairy, chiefly with stellate hairs.

subsp. *Sapini*.

The varieties lie very close to each other, and any criticism as to their validity should be undertaken by someone who can cultivate them easily. This might be done, for instance, by an officer in one of the tropical African agricultural stations.

Solanum macrocarpon, subspecies *S. Sapini*, is the *Solanum Sapini* described by de Wildeman in the Annales du Musée du Congo, Botanique, series 5, vol. 2, 1918, p. 341. Dr. de Wildeman has it still in cultivation, and has been so good as to communicate to the writer, along with excellent specimens, his observation that in the second generation at Brussels, two forms were obtained, one being spinous and the other without spines; the first fertile, the second rarely so. The fertile form is referable to *S. duplosinuatum* Klotzsch. The second appears to have *S. macrocarpon* in it: it is *S. macrocarpon* in the shape of the leaves, in the absence of spines, in the corolla and in the other parts of the flower and inflorescence, except in the calyx, and the greater abundance of stellate hairs. Thus *S. Sapini* is found to be a hybrid of *S. duplosinuatum* with another species which may or may not be *S. macrocarpon*.

Dr. Bitter finds that the species under discussion occurs in the New World. One must assume that it was taken there with negro slaves. The specimens that he has seen from the islands

of St. Croix, and Guadeloupe, he puts into his variety *calvum*, which is elsewhere detected as on the Guinea Coast; but what he has seen from a garden at Lagoa Santa, in Brazil, constitutes his variety *columnaristellatum*.

The plant which the Malays grow is assignable to var. *calvum*.

Bringing together all the localities in the Tropics, from which this plant has been obtained, we get the following list:—

EGYPT.—In cultivation in the Horticultural Gardens, Giza (and elsewhere ?), *Walsingham* 33!

UPPER GUINEA.—Sierra Leone: Boray, cultivated, *Scott-Elliott* 4957! but slightly doubtful. Gold Coast: presumably leaf and fruit used, *Thonning*. Lagos: cultivated for its leaf, *Dalziel* 1189! Togoland: Kete-Kratschi, *Zech* 8, 9; Sansugu, on the west of Basari, *Kersting* 552; Atakpame, cultivated for its leaf, v. *Doering* 326; Basari, cultivated for its fruit, *Kersting* 643. French Cameroons: Victoria, *Buchholz*; Bumbu, near Yoko, in bush-savannah, *Waibel* 191; Yaunde, in savannah near villages, *Zenker* 615. S. Thome, Roca Ledroma, *Mocquerys* 144.

LOWER GUINEA.—Spanish Guinea: Bebai, near Akum, *Tessmann* 577. Belgian Congo: Kisantu, *Gillet* 893. Mussumba of Muata Jamvo in 8·5° S., *Pogge* 331. Portuguese territory: Loanda district; deserted fields between Loanda and Camama, *Welwitsch* 6076! Uije in Congo district, cultivated in all villages for its edible leaves, but not for its fruit, *Gossweiler*, 7446! District of Cuanzasul, on the river Muongo, country of the Quissamas, cultivated, *Gossweiler* 8371!

NILE-LAND.—Uganda: in the Victoria-nyanza region, a race with small leaves, *Maitland* 82! Second march from Lubwas, *Whyte*!

TANGANYIKA TERRITORY.—West Usambara, seeds from Wilhelmstal (raised at Amani), *Brann*. Mozambique coast, Zanzibar, leaves and fruit eaten, *Stuhlmann* 403; seeds (raised at Kew), *Last*! Kidenge, *Stuhlmann*. Kilwa, Kibata upon the south of the Matumbi Mts. at 550 m., cultivated and fruits eaten, *Busse* 3111. Uluguru Mts., Kananga, v. *Brehmer* 978.

NYASALAND.—Without locality, *Buchanan* 1054!

MASCARENIA.—Madagascar, without locality, *Bojer* ex Dunal. Central Madagascar, cultivated, *Parker*! Réunion, St. Denis, rather rare, *Cordemoy*. Mauritius, without locality, *Bouton*. Rolas isle, on the shore, *Quintas* 46. Rodriguez, *Balfour*!

MALAY PENINSULA, not uncommon in Malay gardens, cultivated for its leaves, *Burkill*!

WEST INDIES.—Lesser Antilles. St. Croix, *Benzon*; *Ravn*.
Guadeloupe, Basse-terre, *Duss* 2881.

BRAZIL.—Province of Minas Geraes. Lagoa Santa, in a garden,
Warming.

It has the following names:—

Grosse anghive (Mauritius): Petite bringelle maronne (Réunion): Mélongène de Guinée (Guadeloupe): Gilo (Lagoa Santa).

Agbúri (Kratschi language of Togoland): Atropo (the fruit on the Guinea coast): Ekui-zum (in the S. Cameroons—campo region at Akum): Jingilla (in the Congo district of Angola): Kambayra (Daybamba language of Togoland): Komprinya dua (in Asante language of Togoland): Kva-fyé (Danish values for the letters, on the Guinea coast): Mabele (in the Cameroons at Victoria): Mambwýu (in the Mozambique coast-region at Kibata): Mamote (in Loanda): Mkunga (at Zanzibar): Osun (in Lagos Yoruba): Vòampoabè (in Central Madagascar).

Probably this species can be crossed without difficulty with *Solanum Melongena*, and has been crossed. Parker's Madagascan plant bears the note "fruit like an enormous white tomato," and if correct suggests that this has been done: but the leaves and flowers are absolutely *Solanum macrocarpon*.

XLII.—EUPHORBIA CADUCIFOLIA.

C. E. C. FISCHER.

Under the above name Mr. H. H. Haines in 1914 published the description of a new fleshy, shrubby *Euphorbia* based on plants found by him in the Central Provinces of India. This species was found again in 1921 and 1922 further south in the Madras Presidency, and with this additional material a fuller description including that of the ripe fruit can now be drawn up.

In addition to Mr. Haines' three descriptions referred to below, figure 486 in W. A. Talbot's "Forest Flora of the Bombay Presidency and Sind" (1911), vol. ii, p. 434, is, I feel sure, this plant, but Talbot considered it to be *E. neriifolia* Linn.

Euphorbia caducifolia *Haines* in Indian Forester, xl. 154 (1914); Bot. Bihar & Orissa ii. 143 (1921); List of trees, shrubs and herbs of the Southern Circle, (1916), p. 198; descr. ampl. auctore C. E. C. Fischer.

Frutex carnosus, e basi multiramosus, ramis plus minusve erectis, superne spinosus, inferne inermis, 1.25–2 m. altus, basi 3–5 cm. diametro. *Rami* teretes, tuberculati, laeves, virides; tuberculi spiraliter ($\frac{3}{8}$) dispositi, apice areolis singulis late ellipticis

nigris instructi; spinae geminae e quaque areola, divaricatae, 5–9 mm. longae, acutae, glabrae, juventute rubrae, demum nigrae. *Folia* apice areolarum solitaria, ante anthesin decidua, suborbicularia, acuta, crassa, carnosa, glabra, 8–12 mm. longa, leviter conduplicata, marginibus crispato-undulatis; stipulae minutae, aculeiformes. *Triades cyathiorum* solitariae vel 2–5 fasciculatae in axillis foliorum delapsorum versus apices ramorum, rubrae vel luteo-virides; pedunculi circiter 2–4 mm. longi; bracteae oppositae, late triangulares, apice rotundatae, rubrae. *Cyathia* 4–5 mm. diametro, centralia sessilia, lateralialia pedunculata, pedunculis propriis circiter 4 mm. longis; cyathium centrale saepissime ♂, flore ♀ rudimentario vel rarissime evoluto, ante cyathia lateralialia florens et saepe deflorescens; cyathia lateralialia bisexualia, bracteis duabus oppositis rotundato-ovatis mucronulatis crassis roseis cyathia ternaria minima haud evoluta suffulcientibus instructa. *Involucri lobi* 5, late cuneati, apice fimbriati, circiter 1.5 mm. lati. *Glandulae* 5, tumidae, transverse oblongae, glabrae, supra leviter foveolatae. *Flores* ♂ in fasciculas 5 dispositi, fasciculis 6–7-floris (ante anthesin facile cognoscendis, floribus post lapsum antherarum disjunctis), supra medium articulati, paleis laciniatis interspersis. *Filamenta* glabra vel minute pilosa. *Antherae* luteae, subglobosae, longitudinaliter dehiscentes. *Flores* ♀ pedicellati. *Perianthii lobi* 3, minuti, triangulares, subacuti. *Ovarium* trigonum, minute pilosum, roseum. *Styli* 3, ad medium connati, deinde patentes; stigmata minute biloba, papillosa. *Capsula* acute trigona, circuitu longitudinali plano-convexa, 8 mm. diametro, in cocos 3 bivalves dehiscens; cocci lateraliter compressi, laeves, glabri. *Semina* sphaerica, 3 mm. diametro, laevia, glabra, brunnea, raphi saturate brunnea. *Embryo* compresso-pyriformis, 2 mm. longus.—*E. neriifolia* Talbot For. Fl. Bomb. Pres. ii. 434, fig. 486 (1911), non Linn.

The above description of this species from the Ceded Districts of the Madras Presidency diverges from Mr. Haines' description of the plants of the Central Provinces and Orissa in the following details. It is somewhat larger; the leaves are always small and suborbicular, whereas in the Puri plants they become oblong-obovate and attain a length of 2–3 inches; the anthers are more globose.

CENTRAL PROVINCES.—Raipur district; Satpura Hills, on dry sandstone rocks, *Haines* (Ind. For. l.c.): Pachmarhi, *Haines* (List of Trees, etc. l.c.)

ORISSA.—On the Puri Coast, wild on rocks, *Haines* (Bot. Bihar & Orissa, l.c.)

BOMBAY.—Ahmednagar and Bijapur districts, on rocky soil, *Talbot* l.c.

MADRAS.—Abundant in the following localities. Guntur district: among rocks on the low dry hillocks of the Palnad, *Fischer*. Cuddapa district: Gandlur, 250 m. alt., in gritty soil, *Fischer*; Gandikota Hills, 350 m. alt., *Fischer*; Palkondas, up

to 600 m. alt., *Fischer*; between the Kurnool and Anantapur districts, Yerramalis, *Fischer*.

Vernacular name: "Kattai-jemmudu" (Telugu, Cuddapa District).

The leaves appear during the rainy season (July to September) and fall before the flowers appear from January to March; the fruits were found in Cuddapa in April.

Hitherto the species has not been represented in the Kew Herbarium, but a fragment of Mr. Haines' specimen, which is the type of the species, has been presented together with a number of specimens (some preserved in spirit) from the Cuddapa District, on which the present description is founded.

XLIII.—PROPOSED NEW NOMINA CONSERVANDA: I.

It is generally recognised that the list of *Nomina generica conservanda* is not definitely closed, and that new names may be added by any future International Botanical Congress.* The original list appended to the International Rules adopted by the Vienna Congress (1905) included 405 generic names of *Phanerogamae*. A supplementary list adopted by the Brussels Congress (1910) included 53 additional *Phanerogamae* besides 55 *Algae* and 1 *Pteridophyte*. A combined list, systematically arranged, was appended to the second edition of the International Rules (1912), and an alphabetical list was published in *Kew Bull.* 1921, pp. 321–326.

The Committee on Australian Botanical Nomenclature, of which Mr. J. M. Black is Secretary, now recommends six additional generic names for conservation.

POLYGONACEAE.

Muehlenbeckia Meisn. (1840). Antedated by *Calacinum* Rafin. (1836), *Karkinetron* Rafin. (1836), and *Sarcogonum* G. Don (1839). About 20 species. Standard-species†: *M. australis* (Forst.) Meisn.

CELASTRACEAE.

Denhamia Meisn. (1837). Antedated by *Leucocarpum* A. Rich. (1834). 3 species. Standard-species†: *D. obscura* (A. Rich.) Meisn.

UMBELLIFERAE.

Oreomyrrhis Endl. (1839). Antedated by *Caldasia* Lag. (1821). 7 species. Standard-species†: *O. andicola* (H. B. K.) Endl.

* Vide Schinz & Thellung in Vierteljahrsschr. Nat. Ges. Zürich, lxi. 184 (1924).

† Suggested by Mr. Sprague, in accordance with Resolution (16), 4, of the Imperial Botanical Conference, London, 1924 (*vide* Rep. Imp. Bot. Conf. 1924, 304–6, 384 (1925); *Kew Bull.* 1925, 49–58).

EPACRIDACEAE.

Leucopogon R. Br. (1810). Antedated by *Perojoa* Cav. (1797). Over 120 species. Standard-species*: *L. lanceolatus* (Sm.) R. Br.

COMPOSITAE.

Olearia Moench (1802). Antedated by *Shawia* Forst. et Forst. f. (1776). 60–70 species. Standard-species*: *Olearia tomentosa* (Wendl.) D.C.

Angianthus Wendl. (1809). Antedated by *Siloxerus* Labill. (1806). About 27 species. Standard-species*: *A. tomentosus* Wendl.

A detailed statement, prepared by Mr. Black, of the cases for conserving the above names has been published in the Journal of Botany, July, 1925, pp. 210–213. It will be observed that one of the genera in question, *Olearia*, is very well known in horticulture, and that species of *Muehlenbeckia* and *Leucopogon* are also in cultivation, so that the proposal to conserve these three names should obtain strong support from horticultural circles.

T. A. S.

XLIV.—ADDITIONS TO THE INDEX KEWENSIS: VI.†

The continuation of the Index Kewensis by means of successive quinquennial Supplements prepared at Kew is rendered more difficult by reason of extensive lacunae in Supplement I, which was prepared in Brussels as a private venture. Comparatively little trouble arises when a whole paper has been omitted, as in the case of vol. i. no. 9 (1895) of the Contributions from the U.S. National Herbarium, which was entirely overlooked.‡ When, however, numerous isolated omissions have occurred, they are not only more difficult to detect, but very troublesome to list, as it is necessary to check every species in the paper in order to see whether it has been included already or not.

Monsieur A. Lemée, Trésorier Général du Finistère, has drawn the attention of Kew to the omission from Supplement I of numerous species among those described by Barbosa Rodrigues in Vellozia. The original edition of Vellozia (Contribuições do Museo Botanico do Amazonas), which is evidently rare, was published in 1888, a second edition following in 1891. Only the latter is represented at Kew. For information regarding the first edition Kew is indebted to Miss Ethelyn M. Tucker, Librarian of the Arnold Arboretum, who has kindly supplied references to the page and plate of each of the thirty-seven species published in it. These are now indexed in List I. Only twenty-two of them were included in Supplement I, the remaining fifteen, indicated below by an asterisk, for some unaccountable reason

* Suggested by Mr. Sprague, in accordance with Resolution (16), 4, of the Imperial Botanical Conference, London, 1924 (*vide* Rep. Imp. Bot. Conf. 1924, 304–6, 384 (1925); *Kew Bull.* 1925, 49–58).

† Continued from *Kew Bull.* 1925, 315. ‡ *Vide Kew Bull.* 1924, 168–171.

having been omitted. Seventy additional species were published in the second edition of *Vellosia*, and seventeen of these were omitted from Supplement I. Seven of them, belonging to the genera *Epidendrum*, *Cyrtopodium*, *Burlingtonia* and *Batemannia* were detected individually and inserted in Supplement V. The ten remaining omissions are now indexed in List II. The species marked by an asterisk in List I and the whole of those in List II are being included in Supplement VII of the *Index Kewensis* now in course of preparation.

T. A. S.

I. SPECIES PUBLISHED IN *VELLOSIA*, ED. 1, i. (1888).

<i>Acrocomia</i>	<i>Desmoncus</i>
<i>microcarpa</i> 50	* <i>caespitosus</i> 37
<i>Astrocaryum</i>	* <i>macrocarpus</i> 34
<i>sociale</i> 47	* <i>macrodon</i> 39
<i>yauaperiense</i> 47-48	* <i>nemorosus</i> 36
<i>Bactris</i>	* <i>Philippiana</i> 38
* <i>formosa</i> 43	<i>Dilkea</i>
* <i>Gastoniana</i> 40	<i>Johannesii</i> 24, t. 10
* <i>krichana</i> 41	<i>Entada</i>
* <i>penicillata</i> 42	* <i>Paranaguana</i> 20, t. 7
* <i>tarumanensis</i> 44	<i>Geonoma</i>
<i>Bredemeyera</i>	* <i>Beccariana</i> 33
<i>Isabeliana</i> 5, t. 4	<i>Lasianthera</i>
<i>Capparis</i>	<i>amazonica</i> 13, t. 7
<i>urens</i> 2, t. 2	<i>Orbignya</i>
<i>Caraipa</i>	* <i>sabulosa</i> 54
<i>insidiosa</i> 11	<i>Passiflora</i>
<i>Lacerdaei</i> 10	<i>amalocarpa</i> 29, t. 12
<i>palustris</i> 8, t. 5	<i>hexagonocarpa</i> 27, t. 9
(sphalm. <i>rupestris</i> in tab.)	<i>hydrophila</i> 30, t. 13
<i>spuria</i> 9, t. 5	<i>Salacia</i>
<i>sylvatica</i> 9, t. 5	<i>polyanthomaniaca</i> 16, t. 8
<i>Caryocar</i>	<i>Securidaca</i>
<i>toxiferum</i> 12, t. 6	<i>rosea</i> 7, t. 4
<i>Claytonia</i>	<i>Syagrus</i>
* <i>odorata</i> 22	* <i>Chavesiana</i> 52
<i>Corynostylis</i>	<i>Swartzia</i>
<i>palustris</i> 4, t. 3	<i>chrysantha</i> 21, t. 7
<i>Cymbopetalum</i>	<i>Tacsonia</i>
<i>odoratissimum</i> 1, t. 1	<i>coccinea</i> 26, t. 11.

II. GENERA AND SPECIES PUBLISHED IN *VELLOSIA*, ED. 2, i. (1891) AND NOT HITHERTO INCLUDED IN THE INDEX KEWENSIS.†

<i>Bignonia</i>	<i>Epidendrum</i>
<i>platydactyla</i> 51, tt. 11, 13	<i>Randii</i> 123
<i>vespertina</i> 53, tt. 12, 13	<i>yauaperyense</i> 122
<i>Couma</i>	<i>Leucocalantha</i> (gen. nov.) 46
<i>macrocarpa</i> 32, t. 1	<i>aromatica</i> 47, t. 7
<i>Datura</i>	<i>Maximiliana</i>
<i>insignis</i> 62	<i>longirostrata</i> 112, t. 2
<i>Elcomarhiza</i> (gen. nov.) 44	<i>Nectandra</i>
<i>amylacea</i> 45, t. 6	<i>elaiophora</i> 64, t. 18

† *Maximiliana longirostrata* was inserted erroneously under *Maximiliana* (*Bixaceae*) in Supplement I. *Elcomarhiza amylacea* and *Leucocalantha aromatica* were cited from later works. *Nectandra elaiophora* was inserted as "*claiophora*."

XLV.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies :—

MR. C. N. E. J. DE NEL, B.Sc., to be Inspector of Diseases Plants and Pests, Agricultural Department, Ceylon ; MR. A. H. G. ALSTON, B.A., to be Systematic Botanist, Ceylon ; MR. J. L. SCOTT, B.Sc., MR. W. R. HUDSON, CAPTAIN H. L. HILL, MR. J. E. B. BEDINGFORD, and MR. S. T. PHILLIPS, to be Inspectors of Plants, Gold Coast.

MR. G. G. AUCHINLECK, Divisional Agricultural Officer, Ceylon, has been appointed by the Secretary of State for the Colonies, Deputy-Director of Agriculture, Gold Coast (*K.B.* 1920 p. 136).

MAJOR K. W. BRAID, B.A., B.Sc., F.I.C., F.L.S., has been appointed Professor of Botany in the West of Scotland Agricultural College (*K.B.* 1921, p. 319).

MR. V. S. SUMMERHAYES, B.Sc. (Lond.), has been appointed by the Minister of Agriculture and Fisheries to be an Assistant (Herbarium) in the Royal Botanic Gardens, Kew.

The Albert Medal of the Royal Society of Arts for 1925 has been awarded to LIEUTENANT-COLONEL SIR DAVID PRAIN, C.M.G., C.I.E., F.R.S., for the application of Botany to the development of the raw material of the Empire.

We note with pleasure in the recent Birthday Honours List the following appointments :—C.B.E., MR. F. A. STOCKDALE, Director of Agriculture, Ceylon ; O.B.E., MR. M. T. DAWE, Commissioner of Lands and Forests, Sierra Leone ; M.B.E., MR. A. B. MELLES, Horticultural Officer, France, Imperial War Graves Commission.

By the death of SIR ALEXANDER HOSIE, M.A., LL.D., F.R.G.S., on the 10th March last, Kew lost a valued correspondent. For many years he had been an unfailing resource for accurate information on the economic products of China, of which he possessed an unrivalled knowledge through his long association with the Consular Service. His report on the valuable Insect White Wax, published in the *Kew Bulletin*, 1893, p. 97, is an example of the nature of the information he was able to supply. His assistance in elucidating the identity of the Chinese fibre plants is shown in the correspondence given in *Kew Bulletin*, 1891, p. 247.

When the preparation of the Index Florae Sinensis was being undertaken at Kew his help was enlisted in collecting botanical specimens from Central China and Formosa. As a mark of appreciation for his services to Botany the genus *Hosiea*, founded on a Chinese plant, was named in his honour. (*K.B.* 1906, p. 154).

West African Timbers.—In connection with investigations that were being carried out at the National Physical Laboratory, Teddington, sample logs of *Musanga Smithii* were obtained through the services of the Director of Forests, Nigeria, and the Conservator of Forests, Gold Coast. At the same time attention was drawn to a specimen of a Gold Coast "Corkwood" tree exhibited as a sun-helmet in the Gold Coast Pavilion at the British Empire Exhibition. The Director of Agriculture, Gold Coast, kindly supplied further material and botanical specimens of this tree, which proved to be a species of *Aeschynomene* allied to *A. Pfundii* Taub., and not previously recorded from the Gold Coast. Samples of this wood were also submitted for investigation. The following report on these timbers has now been received and is published by the courtesy of the Director of the National Physical Laboratory.

"The National Physical Laboratory,
"Teddington, Middlesex.

"23rd June, 1925.

"DEAR SIR,

"We are enclosing herewith for your information the results obtained for the thermal conductivity of the two samples of wood of low density which you kindly sent to us for examination.

"Both samples show a somewhat larger conductivity than cork, the value for which may be taken as 0.0001 c.g.s. units. Further, the sample of lower density has the lower thermal conductivity, which is in accordance with our general experience.

"We should like to take this opportunity of thanking you for the samples, which are of great interest to us, and we shall be very grateful for any further samples of light weight timber which you may be able to spare in the future.

"Yours faithfully,

"The Director,

"G. W. C. KAYE,

"Royal Botanic Gardens,

"for Director.

"Kew, Surrey."

REPORT.

The samples received were stated to be *Aeschynomene Pfundii* Taub and *Musanga Smithii* from the Gold Coast and West Africa. Each specimen was tested under conditions which caused a heat flow (1) normal to the grain and (2) parallel to the grain.

The apparatus used consisted of an electrically heated hot plate surrounded by a guard ring. Two similar samples were

placed one on either side of this combined hot plate and guard ring and then the whole clamped between two cold plates maintained at a constant temperature by water circulation.

The temperatures of the hot and cold faces were measured by means of thermocouples.

The heat input to the hot plate was obtained by observations of the watts dissipated in its heating coil.

The values of the thermal conductivities expressed in two sets of units are given in the following table. The figures relate to a mean temperature of 23°C. (73° F.).

Sample.	Gram calories per sq. cm. per sec. for 1 cm. thickness and 1°C. difference in temperature between faces.	B.T.U.'s per sq. ft. per hour for 1 inch thickness and for 1°F. difference in temperature between faces.
<i>Aeschynomene Pfundii</i> Taub.		
Heat flow with grain	0.00021 ₅	0.62 ₅
Heat flow normal to grain	0.00013 ₀	0.37 ₅
<i>Musanga Smithii</i> .		
Heat flow with grain	0.00029 ₅	0.85 ₆
Heat flow normal to grain	0.00018 ₃	0.53 ₀

The weight per cubic foot of the two specimens of wood were:—

<i>Aeschynomene Pfundii</i> Taub	...	7 lbs./cubic foot.
<i>Musanga Smithii</i>	14.2 lbs./cubic foot.

Mrs. Lugard's Drawings of Ngamiland Plants.—In the *Kew Bulletin*, 1909, pp. 81–146, was published a Flora of Ngamiland based on collections made in 1896 by Sir F. and Major E. J. Lugard and in 1897–8 by the latter and his wife. The work of determining these collections at Kew was greatly facilitated by a series of water-colour drawings, made by Mrs. Lugard, which through the generosity of the Bentham Trustees has now been presented to Kew. The collection consists of 245 drawings, some of which are mentioned in the paper referred to above, and many are of special value in showing fleshy structures which cannot be satisfactorily preserved in specimens. Amongst these may be mentioned the new species:—*Portulaca kermesina* N. E. Br., *Toxanthera Lugardae* N. E. Br., *Stapelia kwebensis* N. E. Br., and *Crinum Lugardae* N. E. Br. In addition to portions showing the general structure of the plant, there are usually

detailed analyses of the flowers and often also of the fruit. The drawings form a useful supplement to the specimens and a valuable addition to the Kew collection, especially as many are of species not figured before and are accompanied by notes on the plants.

C. H. W.

Lilies of Eastern Asia.*—Mr. E. H. Wilson has had unrivalled opportunities for studying the lilies of Eastern Asia, having made three journeys to the regions of which they are native; he has been able to watch them under cultivation and has studied them in the chief herbaria of the world. The combination of these three factors has resulted in the production of a volume of great value to the student of lilies and the discussion in the introduction on the relative values of the various characters is worth the attention of all systematic botanists. After a key to the sections and species, detailed descriptions and synonymy of the various species and varieties are given. The references to the much scattered literature, which has been published during recent years, will be of great assistance to all those interested in lilies. The book is illustrated with seventeen plates, some of which are reproduced from photographs taken by the author during his travels.

C. H. W.

Botanical Magazine.—Part iii of Volume cl (1924) was published on April 30th, 1925 and contains the following illustrations with descriptions:—*Chelonistele pusilla* Ridley (t. 9046), from the Malay Peninsula; *Chirita lavandulacea* Stapf (t. 9047), from Indo-Malaya; *Tulipa humilis* Herb. (t. 9048), a native of the North-west and West Persian mountains; *Cupressus Duclouxiana* Hickel (t. 9049), from Central and West Yunnan; *Callistemon citrinus* Stapf var. *splendens* Stapf (t. 9050), from Australia; *Rhododendron Lyi* Léveillé (t. 9051), a native of the Limestone plateau of Anshun, Kweichow, China; *Aronia melanocarpa* Ell. (t. 9052), from Eastern North America; *Primula Beesiana* Forrest (t. 9053), from N.W. Yunnan; *Campomanesia thea* Gilg & Strauss (t. 9054), from South Brazil; *Begonia manicata* Brongn. (t. 9055), a native of the Cordillera of Vera Cruz, Mexico; *Pulsatilla Regeliana* Freyn (t. 9056), from Siberia, and *Protea subpulchella* Stapf (t. 9057), from South Africa.

* The Lilies of Eastern Asia. By Ernest H. Wilson, M.A. Pp. xiv. + 110, 17 plates. Dulau & Co. Ltd., London, 1925. 25s. net.

The Flowering Plants of Taiping.*—In this publication the authors have compiled a list of the flowering plants known to occur in an area of about 400 square miles of which the flora is comparatively well known. A useful and interesting preface describes the locality and furnishes considerable information on its topography, climate and general vegetation and also examines its botanical relationship to that of adjoining tracts and of more remote regions. There are 1980 plants included in the list, and to each species is added a short note on the dates of flowering and fruiting, its habit and distribution and the name of the collector or, failing that, the authority for inclusion. C. E. C. F.

Dictionary of Botanical Equivalents†.—The need of a reference work to the technical words used in foreign botanical literature is often felt. This want was met to a large extent in the publication of the Dictionary of Botanical Equivalents by Artschwager and Smiley, in 1921, in which the English translation is given to French and German botanical equivalents. A revised and enlarged edition of this work including Dutch and Italian terms has now been published.

School Gardens in the Tropics.‡—In this little book Mr. Williams has published a course of lectures delivered to Elementary Teachers in Trinidad. If this origin of the book be kept in view it will be apparent how useful is the information brought together. Apart from a few introductory pages on the aims of a school garden in the Tropics, the lectures are devoted to explaining the most elementary practices of gardening. Tools, hedges, pathmaking, are discussed in addition to explanations of ordinary cultural operations, propagation and planting. The list of economic and ornamental plants suggested for the school garden will apply to most parts of the tropics, and as the plants are generally quoted by their botanical as well as their vernacular name, the list should be of value in countries other than the West Indies. The last chapter contains a brief reference to insect and plant pests. The general gardening practices described are illustrated by plain text figures. The book should prove useful in schools in the tropics generally and also of interest to amateurs who may not be familiar with tropical plants and the principles of Horticulture in the Tropics.

* The Flowering Plants of Taiping in the Malay Peninsula, by I. H. Burkill and M. R. Henderson. Gardens' Bulletin, Straits Settlements, Vol. iii, Nos. 9-12. March 1925. Pp. 303-364, 2 maps, 2 rainfall charts. Price 50 cents.

† Dictionary of Botanical Equivalents, by E. Artschwager and E. M. Smiley. Williams and Wilkens Company, Baltimore. English Agents Baillière Tindall and Cox, 8, Henrietta Street, W.C. 2. 1925, pp. 124, 16s. 6d.

‡ Gardening in the Tropics, by R. O. Williams. Government Printer, Trinidad, 1924. Pp. 64, ill. 15. Price 2s.

British Honduras.*—The new Handbook of British Honduras is a revival of the official Handbooks, the last of which was published over thirty years ago. Considerable changes have taken place in the meantime and the present work gives up-to-date information about all branches of the Colony's activities. The sections dealing with agriculture and forestry are of particular interest especially when studied in connection with the chapters on the general description of the country, the geology and soils, the natural vegetation, meteorological records and the conditions of the labour supply. The trees and medicinal plants, unfortunately, are mentioned generally under their vernacular names only, and the information thus given is not accessible to those who are unacquainted with the country. The photographs are generally indistinct and the plate facing page 58 represents the physiography of the country rather than the geology as stated. The Handbook, however, gives much useful information about British Honduras which should result in its economic possibilities being more fully appreciated.

Indian Trees.†—In this little book the author has endeavoured to help the amateur gardener and lover of nature who, so often in the Tropics, has no means of ascertaining the ordinary trees planted around bungalows and in municipal parks and gardens. Seventy-one trees are mentioned; the brief descriptions are in popular language and are accompanied by notes on their economic uses and a little tree-lore. Each tree is illustrated by a photograph of the flowers or fruits, and in some cases coloured pictures have been introduced. The vernacular names given are those in common use in India and Burma and differ somewhat in their application in various tropical countries. There are one or two inaccuracies which require to be corrected in a future edition, but the book should prove of assistance to those unacquainted with botany and who seek to know the trees they see every day in their compound or city.

Gardening for Beginners.‡—This work has been thoroughly revised and has now reached its eighth edition. The object in view has been to bring the practices of cultivation up to date and treat in a suitable manner subjects which have attained recent popularity. The book is profusely illustrated with photographic reproductions and text figures.

* Handbook of British Honduras. Published by the Crown Agents for the Colonies, 4 Millbank, Westminster, S.W. 1. 1925. Pp. xlii and 461, ill. 32. Price 5s.

† Familiar Flowering Trees in India, by Ida Colthurst. Thacker, Spink and Co., Calcutta and Simla, 1924. Pp. 166, ill. 61. Price Rs. 6.

‡ By E. T. Cook. Published by Country Life Ltd., 20, Tavistock Street, Covent Garden, W.C.2, 1925. Pp. 604, coloured plates 4, plates and text figs. Price 16s.

Evodia hupehensis Dode.—Although introduced as recently as 1908, this Chinese tree has developed so rapidly that ample opportunities are offered of judging its relative value, in comparison with better known trees, for English gardens. It has, at Kew, already attained a height of 20 feet with a head at least 25 feet in diameter made up of numerous branchlets, each one producing a large panicle of red fruits which remain in good condition for some 8 or 9 weeks. *Evodia* is a widely distributed genus of *Rutaceae*, but little was known of it in our gardens before certain Chinese species were introduced early in the present century. Of these species *E. hupehensis* is likely to prove one of the most useful. It was originally discovered by Henry in 1887, but it was not introduced to cultivation in this country until 20 years later. In 1907 Mr. E. H. Wilson collected seeds in Western Hupeh, some of which reached Kew via the Arnold Arboretum in 1908. In Western China the species grows 20–40 feet high with a short, stout trunk up to 3 feet in girth. The widely-spreading head is made up of stout branches and branchlets which may be more or less downy when young. The leaves are opposite, pinnate, and composed of 5–9 opposite or alternate, narrowly-ovate leaflets which are up to 5 inches long and $1\frac{3}{4}$ inch wide at the base, narrowing to a fine point at the apex, the margins shallowly notched at irregular intervals. The upper surface is dark glossy green, the underside paler. On some plants the under surface of the leaflets is distinctly downy while in others the hairs are confined to tufts in the axils of the veins or to the veins themselves. The flowers are small and whitish, and they are produced in large terminal corymbs during late July and August. As soon as the flowers fade the fruits begin to swell and almost immediately become red in colour, the colour increasing in brilliance until the fruits are ripe. They then open and disclose small bright black seeds which remain for several days suspended in pairs from a flattened, paper-like filament. The effect of a tree with a head upwards of 20 feet in diameter, with each branchlet terminated by an erect panicle of fruit up to 10 inches long and 6 inches wide, must be seen to be appreciated. A peculiarity of the fruit is the curved beak-like process which appears at the apex. Fortunately this tree is not difficult to cultivate. It gives excellent results in well drained loamy soil and is increased by seeds. The Kew specimens of this and other hardy species of *Evodia* are to be seen near the side of the path mid-way between the Victoria Gate and the Flag-staff.

W. D.